

## **SUBMITTING PROPOSALS ON DEFENSE NUCLEAR AGENCY TOPICS**

The Defense Nuclear Agency is seeking Small Business firms with a strong research and development capability and experience in nuclear weapons effects and nuclear weapons phenomenology areas. Proposals should be submitted to:

Headquarters  
Defense Nuclear Agency  
Attn: AM/SBIR  
Washington, D.C. 20305-1000

Handcarried proposals should be submitted to:

Headquarters  
Defense Nuclear Agency  
6801 Telegraph Road  
Alexandria, VA 22310

Questions concerning the research topics should be submitted to:

Ms. Betty Fox  
(202) 325-1078

The research categories proposed for study under this programs are:

1. Nuclear Weapons Effects
2. Nuclear Effects Simulation
3. Instrumentation
4. Directed Energy Effects
5. Nuclear Hardening and Survivability
6. Security of Nuclear Weapons
7. Operational Planning and Force Structure
8. Theater Nuclear Force (TNF) Survivability

These topics are further explained below. Additional information beyond that provided herein may be obtained by request from the Address given above.

DNA87-001      TITLE: Nuclear Weapons Effects

DESCRIPTION: Exploratory Development Nuclear weapons effects include air blast, thermal ground shock, water shock, cratering, personnel, and dynamic loading . Of particular interest is the response of materials, structures, and systems to these nuclear weapons effects. Materials of interest include metals, ceramics and composites. Any new materials capable of being used as a structural member is of particular concern for aircraft, missiles, ships (both surface and subsurface) and military vehicles. The response of underground structures, such as missile silos, command and control facilities and communications facilities are especially important. Also of interest are transient and permanent radiation effects on new types of electronics and sensors. Concepts and techniques which will improve the survivability (decrease the response) of systems to these nuclear weapons effects are required.

DNA87-002      TITLE: Nuclear Effects Simulation

DESCRIPTION: Exploratory Development: International treaties preclude the testing of nuclear weapons in the atmosphere and hence we are unable to test military systems in an actual nuclear environment. To compensate for this, other test techniques are used to simulate the effects of the nuclear detonation. Nuclear weapons effects simulation includes: high explosive testing to simulate the mechanical effects, EMP simulation, thermal radiation simulation, and nuclear radiation simulation. Simulation techniques should be as realistic as possible, relatively inexpensive to perform and comparable to the threat environment. Improvements to nuclear simulations are required to address their possible use in a training and/or operational sense for combat troops. An extensive program currently exists for all areas of simulation and one should become familiar with those to see how they can be improved and/or combined in order to make the total process more realistic and more representative of the actual nuclear weapons effect being studied. Both destructive and non-destructive test methods are desired.

DNA87-003      TITLE: Instrumentation

DESCRIPTION: Exploratory Development: Instrumentation is used for measuring nuclear weapons effects and phenomenology parameters and the response of test items exposed to these weapons effects. The instrumentation should be capable of operating under very harsh conditions, such as might be encountered in an underground nuclear test, a high explosive test, or test involving high levels of x-ray, gamma, or neutron radiation. The instrumentation should, for the most part, be survivable and include recording, data transmission and data analysis capabilities. Concepts are required for new instrumentation utilizing state of the art technology which will result in improved data collection with better accuracy at lower cost.

DNA87-004      TITLE: Directed Energy Effects

DESCRIPTION: Research: The effects of directed energy (e.g., lasers) sources on materials, structures and systems are of interest. Of particular interest is the establishment of the correlation between nuclear weapons effects and directed energy effects, the identification of materials which are capable of withstanding both nuclear weapons effects and directed energy effects, and mechanisms by which the directed energy effects actually interact with target materials/structures.

DNA87-005      TITLE: Nuclear Hardening and Survivability

DESCRIPTION: Engineering Development: Techniques for nuclear hardening and survivability of systems/structures against nuclear weapons effects and, where compatible, directed energy effects are required . These techniques should protect the structure or system against the combined effects of blast, thermal and nuclear radiation in the cases of structures or materials, and should also provide protection against electromagnetic and radiation effects wherever any electronic capabilities are involved. In particular, the ability to harden communications facilities and surveillance sensors against electromagnetic pulses is required.

DNA87-006      TITLE: Security of Nuclear Weapons

DESCRIPTION: Measures to improve the security of nuclear weapons against all possible threats are required. This includes the design of security features both for the actual weapons and for the facilities in which weapons are either stored or transported. These security measures should protect against all known or predicted threats and should be done in such a way as to avoid making the protected item visible as a target.

DNA87-007      TITLE: Operational Planning and Force Structure

DESCRIPTION: Research: The nuclear employment planning capabilities of operational commanders in tactical, strategic and integrated warfare environments should be improved. Improvements desired include development of automated planning systems, techniques to determine target damage objective and criteria, post strike target damage assessment capabilities, and automated nuclear weapon employment codes. Also included are those force structure issues pertaining to the effectiveness, security, and survivability of nuclear forces.

DNA87-008      TITLE: Theater Nuclear Forces (TNF) Survivability

DESCRIPTION: Exploratory Development: The prelaunch survivability (PLS) of the TNF is of vital concern. New and innovative concepts to improve PLS are needed to retain a viable nuclear strike capability and to enhance deterrence. The threats to the TNF include enemy forces conducting unconventional, conventional, chemical and nuclear warfare during periods of peacetime, transition to war, and war. Long range program thrusts include peacetime and field storage, deceptive/OPSEC practices, theater nuclear force movements, and operational survivability of theater nuclear systems (aircraft, missiles, and cannon systems). Survivability concepts are wanted for the period of the 1990's and beyond. Concepts should employ innovative ideas and make use of new and emerging technologies.